

## Two research professors members from Institut Mines-Télécom schools awarded ERC Advanced Grants

- Stéphane Avril, research professor at Mines Saint-Étienne, was awarded his third ERC grant for his work on tissue mechanics.
- Ange Nzihou, research professor at IMT Mines Albi, won an ERC grant for his project on decarbonizing heavy industry.
- Cutting-edge research to meet the challenges of the 21st century with a focus on Institut Mines-Télécom's key strategic priorities.

Institut Mines-Télécom stands out as a key player in cutting-edge research, with two of its research professors having won prestigious ERC grants in the Advanced category. This showcases the excellence of the research conducted at IMT schools and highlights its commitment to the major societal challenges of the 21st century, particularly in the areas of digital technology, industry and energy. The scientific communities at Institut Mines-Télécom work at a high international level, as evidenced by the awarding of these ERC scholarships, which are among the most prestigious research grants in Europe.

The research conducted by Stéphane Avril and Ange Nzihou is part of Institut Mines-Télécom's overall strategy for 2023/2027, which focuses on the challenges of the 21st century. This approach allows IMT to position itself as a key player in research through its focus on four major strategic fields: the responsible industry of the future, digital sovereignty and sobriety, energy, the circular economy and society, as well as health and wellness engineering. Stéphane Avril's research strengthens the key focus on health and wellness engineering. Ange Nzihou's work, on the other hand, reinforces the focus on responsible industry of the future.



### Human tissue mechanics: Stéphane Avril pushing back the limits of aging arteries at Mines Saint-Étienne

Stéphane Avril has been recognized for his visionary project focused on controlling the mechanical wear of tissues to delay the effects of aging arteries. This funding will allow Stéphane Avril to continue to innovate and challenge the boundaries of human tissue mechanics.

Stéphane Avril, a research professor at Mines Saint-Étienne, is passionate about biology. He redefines the boundaries between two disciplines by exploring the mechanics of human tissue, with a particular focus on arteries. His unusual career path and innovative work have earned him his third consecutive prestigious ERC grant.

He studies the mechanics of matter that makes up the human body. This discipline combines both physics and biology and aims to gain a better understanding of how human tissue resists deformations and forces applied to it, for how long, and to what extent its functions are altered. The researcher is specifically interested in one type of tissue: the arteries that carry blood from the heart to the rest of the body.

His current research aims to minimize the impacts of aging arteries by controlling the mechanical forces exerted on the cells. His project, called JuvenTwin, draws on his collaboration with international experts in mechanics and biology. This is an emerging research topic. Several studies show that it is possible to slow down aging but in an uncontrolled way. JuvenTwin is therefore part of a body of global research on the aging of arteries and rejuvenation that prioritizes clinical and biological approaches, which Stéphane Avril has supplemented with a mechanical approach.

Learn more about Stéphane's under Creative Commons:

<https://imtech.imt.fr/2024/04/11/stephane-avril-la-mecanique-des-tissus-humains/>



### **Decarbonizing industry: Ange Nzihou is revolutionizing heat storage in heavy industry at IMT Mines Albi**

Ange Nzihou, research professor at IMT Mines Albi and visiting researcher at Princeton University, has been awarded an ERC Advanced Grant for his innovative Storeheat project. The project aims to develop revolutionary bio-based materials for the storage of waste heat from industrial processes, which will contribute to decarbonizing heavy industry. Waste heat refers to heat generated by a process whose primary purpose is not heat production, which means that it is not necessarily recovered.

#### **A key challenge for industrial decarbonization**

Heat waste from industrial processes is often lost. It therefore represents huge potential source of energy. With the STOREHEAT project, Ange Nzihou is working to meet this challenge by developing innovative and environmentally friendly storage solutions to help reduce carbon dioxide emissions from heavy industries. It involves manufacturing a bio-based material for storing and releasing this heat, either in the form of heat or electricity.

#### **Bio-based materials for heat storage**

STOREHEAT is using an innovative approach to replace costly and polluting traditional materials with bio-based materials with low environmental impacts. This carbon-rich resource offers promising potential for heat waste storage to help decarbonize industry.

#### **An interdisciplinary and international approach**

The STOREHEAT project is founded on close collaboration between internationally renowned academic partners, including Hamburg, Nottingham, Brookhaven National Laboratory (BNL) in the United States, and the Odeillo site in France, which is home to one of the world's largest solar ovens.

This interdisciplinary approach will make it possible to explore new high temperature heat storage methods and accelerate the development of innovative solutions.

Building on his previous research in the field of biomass recovery, he hopes to open up new perspectives for industrial heat storage.

## Drivers of innovation

These ERC Advanced grants will help Stéphane Avril and Ange Nzihou to carry out their ambitious and high-risk projects, which will open up new avenues for innovation in their respective fields. With funding of around €2.5 million for a five-year period, these projects aim to push back the boundaries of scientific knowledge and have a significant impact on society.

### About Institut Mines-Télécom [www.imt.fr/en](http://www.imt.fr/en)

Institut Mines-Télécom is the leading public group of French engineering and management schools to be placed under the supervisory authority of the Ministry of the Economy, Finances and Industrial and Digital Sovereignty. It is a public research and higher education institution made up of eight public graduate schools: IMT Atlantique, IMT Mines Albi, IMT Mines Alès, IMT Nord Europe, Institut Mines-Télécom Business School, Mines Saint-Étienne, Telecom Paris and Telecom SudParis as well as two subsidiary schools: EURECOM and InSIC. It leads and develops a rich ecosystem of partner schools and economic, academic and institutional partners and players in training, research and economic development. Created to meet France's needs in economic and industrial development since the 19th century, Institut Mines Télécom's graduate schools have supported all the communications and industrial revolutions. Through its research and its training of engineers, managers and PhD students, Institut Mines-Télécom tackles the major industrial, digital, energy and environmental challenges in France, Europe and around the world. Today, Institut Mines-Télécom and its 10 schools are imagining and building a world that combines science, technology and economic development with a respect for the planet and the people who live on it. It is double Carnot certified and trains 13,600 students every year.



[www.imt.fr](http://www.imt.fr)

### About Mines Saint-Étienne

A member of Institut Mines-Télécom, a French federal Institute of technological universities of science and management for sustainable development, Mines Saint-Etienne is an international engineering school that drives innovations with societal impact. The school has 2,500 students – 27% of whom are international students – and 480 staff across three campuses: Saint-Etienne, Lyon and Aix-Marseille-Provence. The school is listed in two world university rankings: Times Higher Education World University Ranking and QS World University Ranking by subject. It was awarded Sustainable Development and Corporate Social Responsibility certification in 2017. With five research and training centers, one scientific culture center, six research and training chairs, seven technological platforms, a technological incubator, €8 million in partnership research and a budget of €42 million, Mines Saint-Etienne has a proactive policy for supporting companies (start-ups, large groups, microenterprises and SMEs) in their ecological, digital and industrial transitions. The school's mission is: Inspiring Innovation ! [www.mines-stetienne.fr](http://www.mines-stetienne.fr)

### About IMT Mines Albi

IMT Mines Albi trains innovative and humanist general engineers from around the world who incorporate a sustainable development approach in their actions and management.

The school educates meticulous, resourceful engineers who can help bring new momentum to companies. It invents innovative products and processes using cutting-edge research. It also develops these products and processes with industrial partners, thereby contributing to the economic expansion of our region. This is all part of Mines Albi's mission.

IMT Mines Albi has opted to specialize in unique and promising areas that are in keeping with its environment: materials and processes for the aeronautical and space industries, energy recovery from biomass and waste, new technologies for developing pharmaceutical dosage forms and the kinetics of organizations.

The school has been able to attract renowned professors and researchers in these areas, whose work has received international recognition. Companies in the region benefit from their support and unique scientific tools, which creates opportunities for testing the feasibility of new products and processes.

The programs offered at IMT Mines Albi are founded on the school's expertise and are increasingly diverse. They include apprenticeship engineering courses and international Master's programs, which are developed alongside programs for post-preparatory class students.

Since December 2019, IMT Mines Albi has been ISO 9001-certified for all of its activities.

IMT Mines Albi is an Institut Mines-Télécom (IMT) school. IMT is a French federal Institute of technological universities of science and management for sustainable development. It is composed of ten engineering and management graduate schools. The group's strength lies in the complementarity of its schools and their cohesion, founded on a common vision of "All together to imagine and build a sustainable future and to train our key stakeholders." [www.imt-mines-albi.fr](http://www.imt-mines-albi.fr)

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